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An Internal-cooled Totally-enclosed Rotating Electrical Machinery

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Specification

1. Title of the Device

An Internal-cooled Totally-enclosed Rotating Electrical Machinery

2. Claim of the Utility Model

An internal-cooled totally-enclosed rotating electrical machinery comprising a stator having an exhaust opening in the axially-middle thereof and intake openings at both ends thereof, an air cooler arranged in the vicinity of said intake bore of said stator, an exhaust draft duct being connected to said air cooler to form a passage for a coolant flows out of said exhaust opening, and an intake draft duct connected to said air cooler to form a passage for the coolant flows in said intake opening; wherein a guide plate is installed in the vicinity of the exhaust opening in said exhaust draft duct so that the coolant flowing out of said exhaust opening is evenly distributed to right and left in axial direction.

3. Detailed Description of the Device

This device relates to an internal-cooled totally-enclosed rotating electrical machinery that has an air cooler.

Fig. 1 shows a rotating electrical machinery that has been generally known as one of machinery of this type. The numeral (1) denotes a stator frame of a rotating electrical machinery, (2) a draft pipe installed on said stator frame (1), (3) a stator core, (4) a stator winding, (5) a rotor, (6) a fan installed on said rotor, (7) an air cooler, (8) an exhaust draft duct that

forms a drafting passage, (9) an intake draft duct that forms a drafting passage, (10) and (11) respectively a middle exhaust bore and an end exhaust bore each of which is respectively installed in the axial-middle of and at the both ends of said stator frame (1), and (12) intake bores installed at the both ends of said stator frame (1).

The following explains constitution. Air, a coolant, is forcibly fed into by the fan (6). A part of said air passes a gap between the stator core (3) and the rotor (5) as shown with arrows in the drawing, and the rest of which enters into the draft pipe (2) on the stator frame (1) to reach said gap cooling the stator core (3). Then the cooling air passes again the stator core (3) to exhaust from the middle and end exhaust bores (10) and (11). (This drafting style is generally referred to as a compound radiation draft.) The air exhausted from the exhaust bores (10) and (11) passes the air cooler (7) to be cooled and further goes to the intake bore (12) to return to the fan (6) for forcible drafting forming a cooling passage.

In the conventional draft passage structure, an exhaust bore is provided longitudinally with pluralism, or is given a long length in its dimension. Therefore, an exhaust in the vicinity of an air cooler only is the most easily to flow further and, unfortunately moreover, the pressure at an end exhaust, i.e. an air-curtain effect, disturbs the air exhausted out of a middle exhaust bore in its flowing into an air cooler. Accordingly, the longitudinal distribution of the exhaust along the axis becomes very low in the middle portion. This naturally causes the distribution of the temperature rise in rotating electrical machinery to be very high in the middle portion thereof resulting in a local overheat. This is a serious problem.

The present device is endeavored from the viewpoint of elimination of the defect of such kind involved in the prior arts, and provides a rotating electrical machinery wherein the distribution of cooling air is equalized by a guide plate installed in the vicinity of the exit of the exhaust bore.

The following explains one of embodiments of the present device referring to drawings. In Fig. 2, the numeral (13) denotes a guide plate installed in the vicinity of exhaust bores (10) and (11) on the exhaust draft duct (8) so as to separate the end exhaust bore (11) from the middle exhaust bore (10). Explanation for other parts in constitution than the above are omitted since they are the same as those in the conventional machinery.

The present device provides, as described above, the guide plate (13) for cooled air in the vicinity of exit of the end exhaust bore (11) so that the pressured-air exhausted from the end exhaust bore (11) will not disturb the air exhausted from the middle exhaust bore (10) in its flow into the air cooler (7) to make the air, the coolant, flow evenly to the right and left.

The drafting passage in this embodiment has three exhaust bores of the compound radiating draft type. However, the number of the exhaust bore is not always limited to three, and the longitudinal shape thereof can of course have a lengthened dimension. Further, the number of the guide plate may obviously allowed to be increased according to the drafting volume although the embodiment shows one plate for one air cooler.

According to the present device as described above, the guide plate is installed in the vicinity of the exhaust bore for equalized axial flow of the coolant (air) to right and left in

the rotating electrical machinery. Therefore, the distribution of the temperature rise in the rotating electrical machinery is longitudinally equalized with eliminated local overheats. Further, the distribution of the drafting volume for the air cooler is also equalized with improved cooling efficiency, miniaturized size, and raised machinery efficiency. Thus, the machinery comes to have many advantages.

4. Brief Description of the Drawings

Fig. 1 is a sectional front view of the conventional rotating electrical machinery. Fig. 2 is a sectional front view of the rotating electrical machinery in one of the embodiments of the present device.

Numeral (1) denotes a stator frame, (2) a draft pipe, (3) a stator core, (4) a stator winding, (5) a rotor, (6) a fan, (7) a air cooler, (8) an exhaust draft duct, (9) an intake draft duct, (10) a middle exhaust bore, (11) an end exhaust bore, (12) an intake bore, and (13) a guide plate.

The same numerals in said drawings show the same elements or equivalents.

Fig. 1

第1図

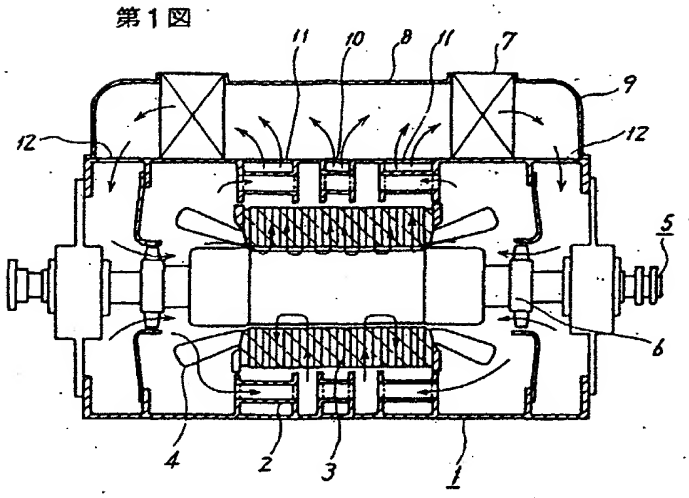

Fig. 2

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